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REPORTS ON THE SCIENTIFIC RESULTS OF THE EXPEDITION TO THE EASTERN TROPICAL PACIFIC, IN CHARGE OF ALEXANDER AGASSIZ, BY THE U. S. FISH COMMISSION STEAMER "ALBATROSS," FROM OCTOBER, 1904, TO MARCH, 1905, LIEUT. COMMANDER L. M. GARRETT, U. S. N., COMMANDING.

XII.

THE REPTILES OF EASTER ISLAND.

BY SAMUEL GARMAN.

WITH ONE PLATE.

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CAMBRIDGE, MASS., U. S. A.:
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[3] Bull. M. C. Z., Vol. XLVI., No. 9, September, 1905, 5 pp., 1 pl.
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[5] Mem. M. C. Z., Vol. XXXIII., January, 1906, 90 pp., 96 pls.
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No. 1. — *Reports on the Scientific Results of the Expedition to the Eastern Tropical Pacific, in charge of* ALEXANDER AGASSIZ, *by the U. S. Fish Commission Steamer "Albatross," from October*, 1904, *to March*, 1905, *Lieutenant Commander* L. M. GARRETT, U. S. N., *Commanding.*

XII.

The Reptiles of Easter Island.

By SAMUEL GARMAN.

To give an approximately complete idea of the Herpetology of Easter Island it is necessary to consider and to introduce provisionally into our list of species a number of marine tortoises and a sea serpent, which range throughout Polynesia and the tropical and the temperate portions of the Pacific and the Indian oceans, but which have not yet been taken or known directly from the island by the scientist. The snake has the better claim to attention, having been secured a short distance from the shores and positively determined. The tortoises, of which our knowledge depends wholly upon tradition or other evidence of the natives, cannot be satisfactorily identified, and if they might be, they would add little or nothing in answer to questions relating to the origin or the evolution of the fauna. This leaves as the main dependence in this study two species of small lizards, a third and larger one, the existence of which is asserted by the islanders, having, if it exists, escaped capture. From the material gathered it appears that these lizards were not originally derived from the nearer islands to the westward, in the direction of Samoa and the Fijis, but from the Hawaiian Islands to the far northwestward. We can go no farther until possessed of more material. That the Hawaiian Islands and Easter Island may both have obtained the species from some other locality is possible, but of that we have as yet no proof, while it can be said that the affinities of the species from the two localities are markedly direct. Drifting from one to the other being put aside as improbable, Hawaiian lizards may have

been carried to Easter Island in several ways; they may have been landed from some vessel passing, toward the straits or to round the Cape, on its way to the Atlantic, — as we suppose some of the same species have been taken to both western and eastern coasts of South America, — in times more recent than the arrival of the islanders now in occupancy, or the saurians may have been brought with the natives when they came. Ethnologists having failed, so far, to determine the original home of the people from racial characteristics and language, or from their art as seen in the sculptures, and tablets, etc., the hypothesis is permissible, from even so attenuated a thread of evidence as that supplied by the reptiles, that when the men came the lizards came with them. Beyond this it might be possible to account at once for the undifferentiated condition of the species and for the lack of energy and of art in the present inhabitants of Easter Island by a further supposition that the makers of the images and the tablets were swept away by the latest eruption of the volcano, and that their successors with the lizards are the result of a subsequent migration from the Hawaiian Islands or thereabout, an indirect route for the reptiles, as for man, from central Polynesia.

At the first glance various features of Easter Island combine to make the study of its fauna appear to be one of particular attractiveness to the naturalist: such are position, origin, isolation, extent, diversity, and climate; it lies near the middle of the South Pacific (Lat. 27° 10′ S.; Lon. 109° 26′ W.); it originated as a volcano, without connection with other land; it has an area of about thirty-four square miles; it possesses plains, hills, and mountains (to 1700 feet), and it is covered with vegetation. A sense of disappointment comes upon one when in the course of his investigations he realizes how much the island lacks age, that its birth has been too recent for the evolution of species and varieties in a fauna of its own, when he decides that what is possessed it has borrowed in times not very remote and that he must direct his attention to the route by which it was brought. Possibly more than one start was made by flora and fauna to be destroyed by later activity of the expiring volcano; at any rate eruptive evidences confine the natural history within comparatively narrow limits of time. All of the literary history is decidedly new; it begins with Davis's alleged discovery, 1686, though the little he contributes to knowledge is not positively located and may have pertained to some other islet. Roggewein, April 7, 1722, discovered the island, named it, and furnished a general description with some infor-

mation concerning people and customs. That the early writers say nothing about reptiles is not to be interpreted as if owing to non-existence but merely to non-observance; several of their statements are repeated here. Why the tortoises should have escaped their notice so completely does not appear; shells and skulls are always in evidence where tortoises are consumed. Captain James Cook, 1774, in his second voyage, gives many details relating to the island and its inhabitants. In regard to the forests the condition apparently had become worse. His men saw "not an animal of any sort and but very few birds." "They have a few tame fowls, such as cocks and hens, small but well tasted. They have also rats, which, it seems, they eat; for I saw a man with some dead ones in his hand; and he seemed unwilling to part with them, giving me to understand they were for food. Land birds there were hardly any; and sea birds but few; these were, men of war, tropic, and egg birds, nodies, tern, &c. The coast seemed not to abound with fish; at least we could catch none with hook and line, and it was but very little we saw amongst the natives." Vol. I, p. 288. La Pérouse, 1786, made additions to the fauna in the sheep, goats, and pigs he left. He says: "La côte m'a paru peu poissonneuse, et je crois que presque tous les comestibles de ces habitans sont tirés du règne végétal." Beechey, who visited the island in 1825, like his predecessors, found the people and their sculptures of first interest. He decided that the natives were "allied in language and customs to many islands in the South Sea," in none of which were such images. He tells us there was not a quadruped on the island in Roggewein's time, and adds, "nor has any one except the rat ever been seen there," Vol. I, p. 56. When discovered, the island is said to have "abounded in woods and forests, and palm branches were presented as emblems of peace; but fifty years afterwards, when visited by Captain Cook, there were no traces of them left." What is known of the fauna through the early literature contains nothing satisfactory on the herpetology. In Thomson's narrative, 1891 in the Smithsonian Report for 1889, there is matter of more pertinence. This article has more general information than those which preceded it. From it we get a better idea of the plant and animal life. Of animals there were on the island at this time, according to this author, neat cattle, rough little horses, many sheep, some rats, a few large and wild cats, some dogs, and some domestic fowls. "There are no quadrupeds peculiar to the island except several varieties of rodents." No small land birds, "only the tropic or man-of-war bird, petrels, gulls, and a variety of aquatic birds." The following concerning

the fishes is quoted in contrast with the statements of Cook and La Pérouse: "Fish has always been the principal means of support for the islanders, and the natives are exceedingly expert in the various methods of capturing them. The bonito, albicore, ray, dolphin, and porpoise are the off-shore fish most highly esteemed, but the swordfish and shark are also eaten. Rock-fish are caught in abundance and are remarkably sweet and good. Small fish of many varieties are caught along the shore, and the flying-fish are common. Eels of immense size are caught in the cavities and crevices of the rock-bound coast. Fresh-water fish are reported to exist in the lakes inside of the craters, but we did not see any of them." Of particular interest in the present writing are the statements concerning tortoises. The author does not explain why he classes them with his fishes rather than his reptiles. "Turtles are plentiful and are highly esteemed; at certain seasons a watch for them is constantly maintained on the sand beach. The turtle occupies a prominent place in the traditions, and it is frequently represented in the hieroglyphics and also appears on the sculptured rocks." Other notice occurs in the translations of the tablets: "What power has the Great King on the land? He has the power to clothe the turtles in hard shell, the fish with scales, and protects every living thing. All hail the power of the Great King who enables us to overcome the defense of the turtles, fish, and all reptiles." Elsewhere it is said that Hotu-Matua and his three hundred, arriving on the island, from land to the eastward, subsisted for the first three months entirely upon fish, turtle, and the nuts of a creeping plant found growing along the ground. And in the account of Machaa's arrival with six companions, two months before Hotu-Matua, we learn that on the second day after arriving this party found a turtle on the beach near Anekena, and one of the men was killed by a blow of its flipper in trying to turn it over. At the point Ahuakapu, Mr. Thomson says, "Upon the extreme point we found another one of those round towers, built for the purpose of observing the movements of turtles on the beach." Concerning other reptiles an item is given on page 459: "Small lizards are frequently seen among the rocks; the natives claim that a large variety is not uncommon, but we saw nothing of it. No snakes exist." Small reptiles, no doubt, would find food in the several varieties of butterflies, the myriads of troublesome flies, the fleas that were worse than the flies, the mosquitoes about the water tanks, the cockroaches two inches long with antennae to correspond, infesting every house on the island, and the peculiar variety of snapping beetle which "made its appearance every evening just before

sundown, appearing suddenly and vanishing with daylight," and which compelled other visitors to stuff their ears with paper.

Confining attention exclusively to the reptiles, it is found that besides the snake and the lizards collected by the "Albatross" there are five or six that may reasonably be expected to figure in later reports. Of these the larger not uncommon variety of lizard is the most indefinite and uncertain. The other four or five are marine tortoises. What is known of the wanderings of these creatures leads to anticipation of the discovery of any or all of the species of the Central Pacific at one time or another on Easter Island. Apparently the notices quoted above indicate that by one or more of the species the island has been adopted as a breeding-place, and that the return to it is regular at a particular season of the year. Unless there are grassy feeding-places near enough in the vicinity the species of the genus Chelonia will probably not be of the regular visitors but of the erratic and accidental. In compiling the list of species to be expected, those recently described from the Chilian coasts by Dr. Philippi have not been introduced, one reason being that they have not been sufficiently distinguished from the species of the Middle Pacific, and another being the unlikelihood of any species crossing from the South American shores through the Humboldt current, 900 miles in width, setting to the northward, and the additional 1200 miles of barren, comparatively foodless waters, pointed out by Mr. Alexander Agassiz, making more than 2000 miles separating the continent and the Galapagos islands, on east and north, from Easter Island. Atlantic species of these tortoises have not yet been shown to be able to pass either Magellan's Strait or south of the Cape, while it is to be expected that species from the Panamic region work their way southward along the coasts of America, reasons both for hesitation in regard to acceptance of Dr. Philippi's species as different from the Polynesian species until proved to be distinct by close comparisons.

Including the tortoises, the Easter Island Reptilia belong to the Chelonia, the Ophidia, and the Sauria.

CHELONIA.

DERMOCHELIDAE.

Dermochelys schlegelii.

TRUNK OR LEATHER BACK.

Sphargis mercurialis Temm. & Schl., Fauna Jap. Rept., 1838, p. 10.
Sphargis schlegelii Garman, Bull. 25 U. S. Mus., 1884, 292, 303.

This species ranges from Japan southward in the Pacific and the Indian oceans. *Sphargis angustata* Philippi may on comparison prove to belong to this species; it is more likely to be thus than that the Atlantic species should pass the straits of Magellan.

CHELONIIDAE.

Caretta olivacea.

LOGGERHEAD.

Chelonia olivacea Eschscholtz, Zoöl. Atlas, 1829, pt. 1, p. 3, pl. 3.
Caretta olivacea Stejneger, Bull. 58, U. S. Mus., 1907, 507.

Localities given for this species are Japan, China, Bonin Islands, Philippines, Bismarck Archipelago, Calcutta, Indian Ocean, Malabar, and East Africa. This is one of the most variable of the marine tortoises. Of five specimens before me two have six costal shields on each side, one has five on one side and six on the other, two have six on one side and seven on the other. Of the same individuals three have two pairs of prefrontals each, and two have each two pairs of prefrontals and an azygous shield in the same area. The specimen having six costal shields on one side and seven on the other agrees in the same respects with that figured by Eschscholtz; none of these individuals agree with it in either shapes or numbers of prefrontals. In the same lot the dorsal shields number from six to eight.

Chelonia japonica.

GREEN TORTOISE.

Testudo japonica Thunberg, Svensk. Vet. Ac. Nya Hand., 1787, vol. 8, 178, pl. 7, fig. 1.
Chelonia japonica Schweigger, Prodr. Mon. Chelon., 1814, 21.

Reported from Japan, Bonin Islands, Formosa, New Guinea, Moluccas, Malay Peninsula, Penang, Bengal, India, and Indian Ocean.

Chelonia depressa.

GREEN TORTOISE.

Chelonia depressa Garman, Bull. Mus. Comp. Zoöl., 1880, vol. 6, 124.

The locality given with the type of this species is North Australia. Whether it was a wanderer there has not yet been determined. Though very distinct from *C. japonica* in the adult stage, it may be much more closely allied to it in the young, in which case indentification of small specimens may present some difficulties.

Eretmochelys squamosa.

HAWK BILL OR SHELL TORTOISE.

Eretmochelys squamata Agassiz, Contr., 1857, vol. 1, 382 (not *T. squamata* Gmelin).
Caretta squamosa Girard, U. S. Expl. Exp. Herp., 1858, 442, pl. 30, figs. 1–7.

Except to the westward and the north the distribution of this tortoise is but partially indicated by the following localities: Japan, Formosa, China, Singapore, Sulu Seas, Moluccas, Bengal, Indian Ocean, Zanzibar, Mauritius, Sunda Islands, Torres Straits, Bismarck Archipelago, Southern Pacific Ocean, Society Islands, Isle de Carmen, Gulf of California. Eight specimens show no variations in costals and frontals. In eight specimens of *E. imbricata*, from the Atlantic, there are three which vary from the normal, of four costals each side and two pairs of prefrontals; one of the three has five costals each side, and two pairs and an azygous prefrontal; another has four costals one side and five the other; and the third has five prefrontals, that is, two pairs and an azygous shield.

OPHIDIA.

HYDRIDAE.

Hydrus platurus.

Anguis platura Linné, Syst., 1766, Ed. 12, 371.
Hydrus platurus Boulenger, Nat. Fauna Ind. Rept., 1890, 397.

Scales on the body hexagonal, juxtaposed, irregular and imbricated on the tail. Longitudinal rows fifty-six; transverse rows three hundred eighty-three on the body, plus fifty-three on the tail. Labials eight on one side, nine on the other; infralabials eleven on each side. A diamond-shaped interparietal, not in contact with the frontal. About sixteen rows of scales on the back are black; below the black a yellow band, from around the snout on the supralabials, passes along each flank, occupying about six rows of scales; below the yellow bands, starting from the chin on the infralabials and along the flanks on each side a band of black, four to six scales in width, continues for about two-thirds of the length beyond which

the bands are broken into large rounded spots, five or six, which extend downward into the series on the lower edge of the tail. Between the large spots on the upper edge of the tail and those on the lower edge there are irregular smaller spots of black. The belly to within a short distance from the vent is dingy yellowish; on the gular region there are several spots of brown. The peculiar coloration of this specimen represents an extreme phase of a variation from which, in collections made in Panama and San Miguel, Colombia, for the John E. Thayer Expeditions, we have the intermediates grading into the common black-backed, yellow to brownish-yellow-bellied, spotted-tailed form, without lateral bands of black or brown, common throughout Polynesia. This sea serpent was taken in Lat. 26° 34′ S.; Long. 108° 57′ W., about fifty miles northeast of Easter Island. It has been directly compared with numerous specimens, from China, Gulf of Siam, Singapore, Borneo, Java, Bay of Bengal, Society Islands, and Panama, without discovery of characters on which to base so much as a variety.

SAURIA.

GECCONIDAE.

Lepidodactylus lugubris.

Figs. 1-6.

Platydactylus lugubris D. & B., Erp. Gén., 1836, vol. 3, 304.
Lepidodactylus lugubris Fitzinger, Syst. Rept., 1843, 98.

The Easter Island specimens of this little Gecko are ashy to light brownish-gray. Whether intense or faint, the markings are distinct on all. The brown band from the rostral plate through the eye to the shoulder is bordered above by a white streak that is more distinct on the head behind the eye. Each of these specimens has an elongate small spot of brown or black on the occiput. In most cases there are small elongate spots of brown immediately above the limy bunch at each side of the neck and above the shoulder. The usual pattern on the back from behind the head to the thighs is made up of seven to eight transverse zigzag streaks of brownish, each edged behind by a white one. These lines make a sharp angle forward where they cross the vertebral line. Toward the hips the border becomes darker or black, showing a series of black spots at each side of the median line at the base of the tail, and the white bands become wider and more distinct. In some examples the white band through the eye is more or less faintly indicated along the entire flank, and is bordered above and below with darker lines that start respectively from the top of the eye and from the ear. From a point below the eye, above the angle of the mouth, a narrow light-edged streak of brownish extends backward toward the throat. The head is light brown, mottled with darker; the labials, chin, and throat are whitish, freckled with light brown. The tail has about ten transverse bars of white separated by light brown bands, in each of which, at each side of the median line, a spot of black is com-

mon. Posteriorly on the tail the spots of black become less dark and more fused. The lower surface of the tail is white. In several individuals there is an indefinite band of brownish from eye to eye across the forehead; in some one or two less definite bands cross the snout. On Easter Island specimens the bunches, as we may call the limy swellings at each side of the neck, are large and apparently made of two portions, a small posterior and a larger anterior, which latter on some of the larger examples extends somewhat below the throat. In the young these bunches are not to be seen. Specimens from Samoa, collected by Dr. W. McM. Woodworth, differ from the preceding in lacking the spot on the occiput and in having the bunch at each side of the neck smaller, rounder, nearer the shoulder, and farther from the ear. Others from the Fijis show the neck bunches still further reduced in size, so much so as to make them hardly perceptible. One from Mangareva is much darker than the Easter Island representatives; it has fewer transverse bands on the body, but has the occipital spot and those above the bunches; the latter are small and placed far back; on the snout there is a mark shaped like a horseshoe, open forward; a band from eye to eye curves forward, and behind it there is another curving backward. Our specimens from Oahu confirm the remarks made by Dr. Stejneger as to being more robust; they indicate existence of a probable variety (*roseus*). Those from the Marshall Islands are like them. Individuals from Oahu have very large bunches on the neck, extending from shoulder to ear, and towards the nape and middle of the throat; they have numerous and large black spots on the middle of the back (old specimens, probably). Such specimens were described by Cope, 1868, under the name *Peropus roseus;* at most they represent only a variety of *Lepidodactylus lugubris* D. & B., 1836. *Gehyra oceanica,* hitherto not credited to the Hawaiian fauna, was also secured on Oahu. Maui specimens of *L. lugubris* are less robust, are smaller, and the bunches are like those of Easter Island, small and far back. On one of them the bunches are hardly noticeable. The spots are absent from the middle of the back, but are distinct above the shoulders and hips. On an Ebon, Marshall Islands, specimen the bunches are in longitudinally connected groups of three; on others from Apaiang, Gilbert Islands, the bunch is near the shoulder and far from the ear.

The figure of the type furnished by the "Voyage au Pole Sud," Plate 1, Fig. 1, does not present a very correct idea of the markings, as but few are indicated. Those shown are situated as in the greater number of individuals, yet on those which show the spots so distinctly there is, on most examples, a larger number of markings that are quite as characteristic which are not traced in the figure. The drawing shows the two black spots on the neck, a couple of the spots on the base of the tail, a small spot on the occiput, and a number of dark spots irregularly scattered over the body; it has none of the six or seven transverse bands of brownish edged with light between shoulders and thighs and continued in the ten or more bands across the tail, in each of which there is usually a dark spot at each side of the vertebral line.

The Easter Island form appears to be more closely allied with the Hawaiian than with those obtained from islands more directly to the westward.

SCINCIDAE.

Cryptoblepharus poecilopleurus.

Figs. 7–12.

Ablepharus poecilopleurus Wiegm., N. Act. Caes. Leop., 1835, vol. 17, 202, pl. 18, fig. 1.

Cryptoblepharus poecilopleurus Wiegm., l. c., 204.

Excepting in the tendency to vary there appears to be little by which we can separate Easter Island representatives of this species from those taken on certain of the Hawaiian Islands. The latter are regarded as typical of the species. Originally the description was drawn from an individual secured on the islands near Pisacoma, Peru; it in all probability was, like the one reported by Boulenger from Bahia, Brazil, an accidental or a descendant of one that had been carried far from the home of the species. *C. poecilopleurus* is likely to have sprung from *C. boutonii* and to have originated in or near the Hawaiian Islands. The parent form possessed a smaller number of rows of scales and had but four labials in front of each suborbital; or, in a general way, it had a smaller total number of scales on the individual. *C. nigropunctatus* from the Bonin Islands stands closer to *C. boutonii*; its scale rows number from twenty-four to twenty-six, and it has but four labials. A large specimen of this form measures about five and three-fourths inches in total length, the body two and one-eighth; the lateral streaks are very indistinct and the entire upper surfaces are freckled with brown and with silvery white. A couple of specimens from Wake Island must also be placed among those nearer *C. boutonii*. Their differences from one another are of enough interest for description here: — one of them has twenty-eight rows of smooth scales and has no supranasals between the internasal and the nasals; the other has twenty-six rows of faintly grooved scales, has a supranasal on each side, formed by a longitudinal division of the nasal, and has the tail forked near the end in such a manner as to make it appear that the deformity was congenital; each of them has four labials. From these localities southward the number of scale rows decreases. It is to the southwest that the species with fewer rows of scales predominate, the numbers decreasing until on *C. rutilus* there are but twenty. More distant allies from West Australia have sixteen rows and three labials. *C. eximius* from Moala and Naikobu, of the Fijis, has twenty-two rows of scales and four labials. *C. heterurus* from Gilbert Islands exhibits a variational tendency similar to that of *C. poecilopleurus* from Easter Island, but it has a smaller number of rows of scales. Comparing nine specimens from the latter locality with the same number from the Hawaiian Islands, it will be seen that a slight divergence has set in which continued, with isolation, selection unnecessary, for a sufficient period will account for a new variety and eventually a new species, an offshoot from *C. poecilopleurus*. Eight of the nine from Easter Island have 28 rows of scales each, one has 30; two have 4 labials on each side, five have 5 on each

side, and two have 4 on one side and 5 on the other; six have normal prefrontals, that is, the prefrontals are in contact between frontal and internasal, two have an azygous prefrontal with the regular prefrontals in contact, and two have the azygous separating the prefrontals. Of nine Hawaiian individuals seven have 28 rows of scales each, two have 30; five have 4 labials on each side, two have 4 on one side and 5 on the other, one has 3 on one side and 4 on the other, and one has 3 on each side; eight have normal prefrontals and one has an azygous shield separating the prefrontals. The Easter Island specimens show an increase in the number of scales on the head; those from the Hawaiian Islands a slight decrease. In the labials alone the four on each side in front of the suborbital, as seen in the greater number of the Cryptoblephari, are represented by an average of four and two-thirds in the Easter Island specimens noted above, and on the Hawaiians by an average of little more than three and nine-tenths. If such averages may not be accepted as differences sufficiently tangible for the establishment of the variety, *paschalis*, they may at least be said to indicate the process of forming new species by means of hereditary tendencies in variation. There is nothing to separate the two localities in the coloration; the redness of the end of the tail is apparent on some. Among the specimens collected by Dr. H. B. Bigelow are some very dark ones, slaty on the belly, on which the light lines are almost invisible; these are marked "taken under rocks," a locality which probably accounts for the difference in color, the species undergoing considerable changes on removal from light to darkness or the reverse. There is nothing in the structure to distinguish the dark ones from the light ones as represented in Fig. 7.

EXPLANATION OF PLATE.

FIG. 1. *Lepidodactylus lugubris* D. and B. Easter Island. One and one-half times natural length.
FIG. 2. Lower view of chin scales.
FIG. 3. A young specimen. Mangareva Island. About one and one-half times natural length.
FIG. 4. Side view of head.
FIG. 5. Lower view of foot.
FIG. 6. Specimen showing a new tail growing from the top of the base instead of, as usually, from the broken end. Suva, Viti Levun Island.

FIG. 7. *Cryptoblepharus poecilopleurus* Wiegm. Easter Island. Enlarged one-ninth of the length.
FIG. 8. Upper surface of snout.
FIG. 9. Upper surface of head of a second individual.
FIG. 10. Upper surface of head of a third specimen.
FIG. 11. Side view of head.
FIG. 12. Upper surface of the head of a fourth example showing, with figures 8–10, the variations in squamation.

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A. AGASSIZ and H. L. CLARK. The "Albatross" Hawaiian Echini.
S. GARMAN. The Plagiostomes.

Reports on the Results of Dredging Operations in 1877, 1878, 1879, and 1880, in charge of ALEXANDER AGASSIZ, by the U. S. Coast Survey Steamer "Blake," as follows: —

C. HARTLAUB. The Comatulae of the "Blake," with 15 Plates.
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" The Schizopods.
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JOHN MURRAY. The Bottom Specimens.
P. SCHIEMENZ. The Pteropods and Heteropods.
THEO. STUDER. The Alcyonarians.
—— The Salpidae and Doliolidae.
H. B. WARD. The Sipunculids.
W. McM. WOODWORTH. The Annelids.

Reports on the Scientific Results of the Expedition to the Tropical Pacific, in charge of ALEXANDER AGASSIZ, on the U. S. Fish Commission Steamer "Albatross," from August, 1899, to March, 1900, Commander Jefferson F. Moser, U. S. N., Commanding, as follows: —

A. AGASSIZ. The Echini.
F. E. BEDDARD. The Earthworms.
H. L. CLARK. The Holothurians.
W. H. DALL. The Mollusks.
—— The Volcanic Rocks.
—— The Coralliferous Limestones.
J. M. FLINT. The Foraminifera and Radiolaria.
S. HENSHAW and A. G. MAYER. The Insects.
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